Open, Interoperable Systems for Energy Savings

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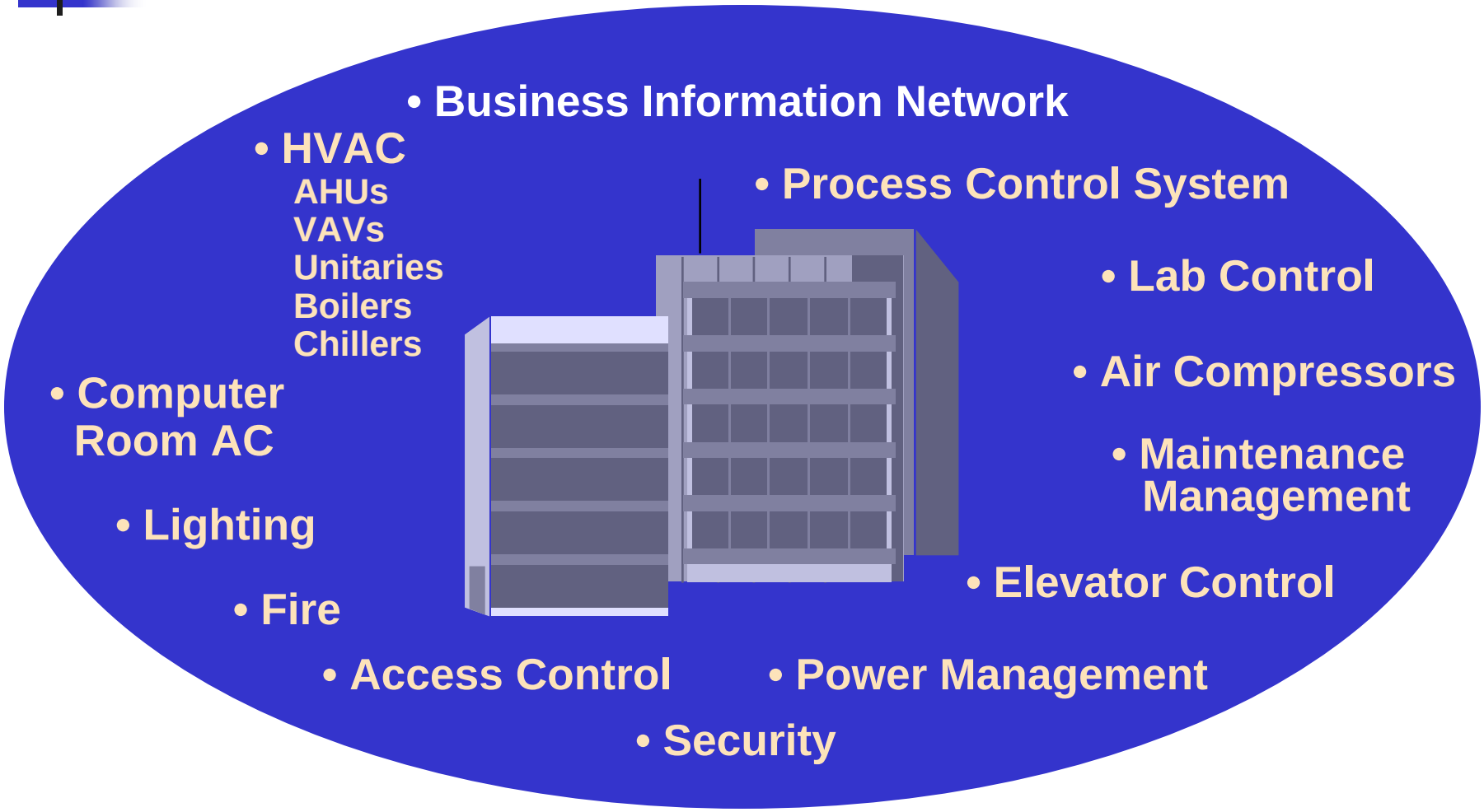
What is an “Open, Interoperable System”?

- Integration of multiple building systems to improve operational, functional, or energy efficiency
- Uses products and components from different vendors
- Is not absolutely dependent on a single integrator’s proprietary tools (long term)

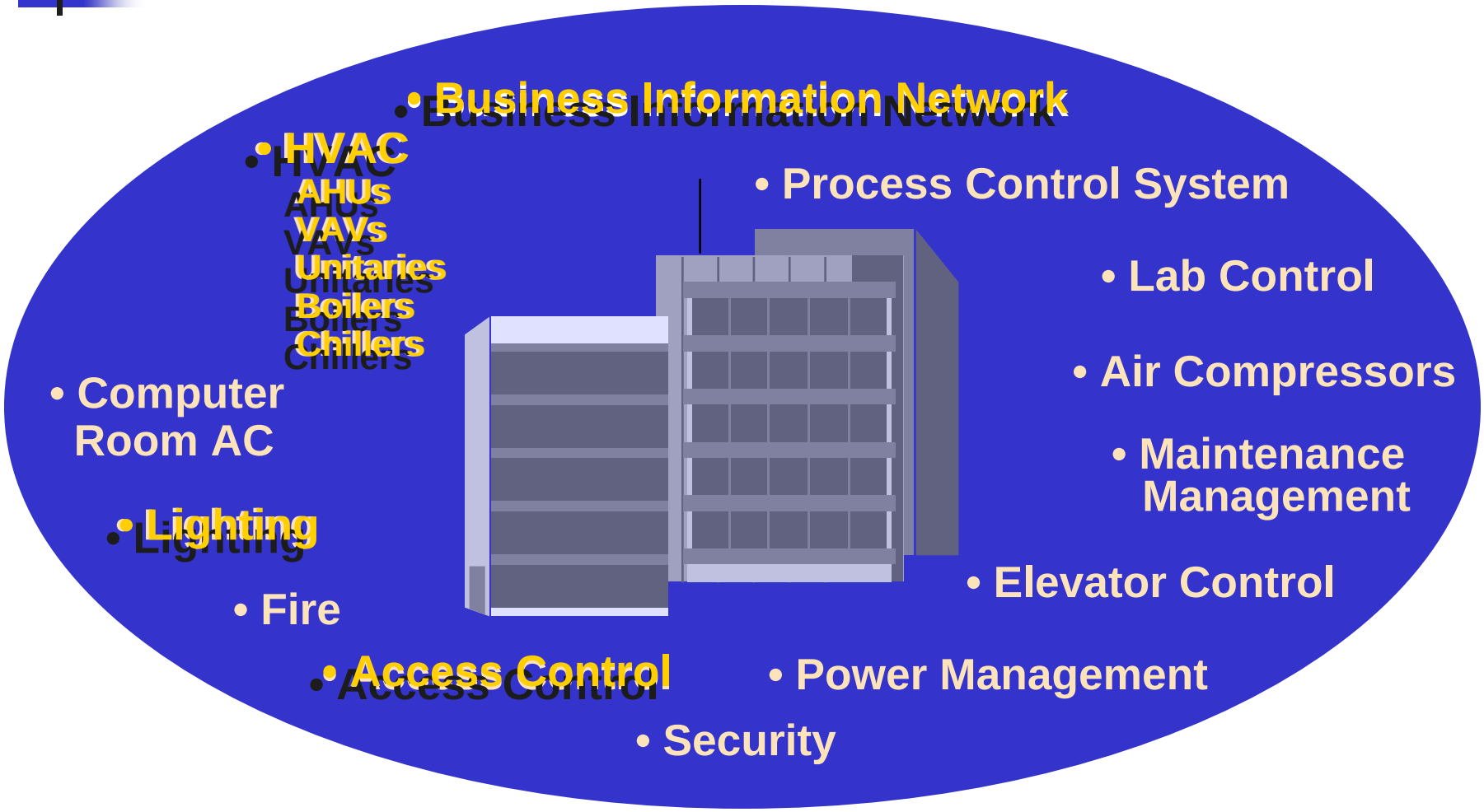
Building Control Systems

Multiple Systems - Multiple Vendors



Building Control Systems

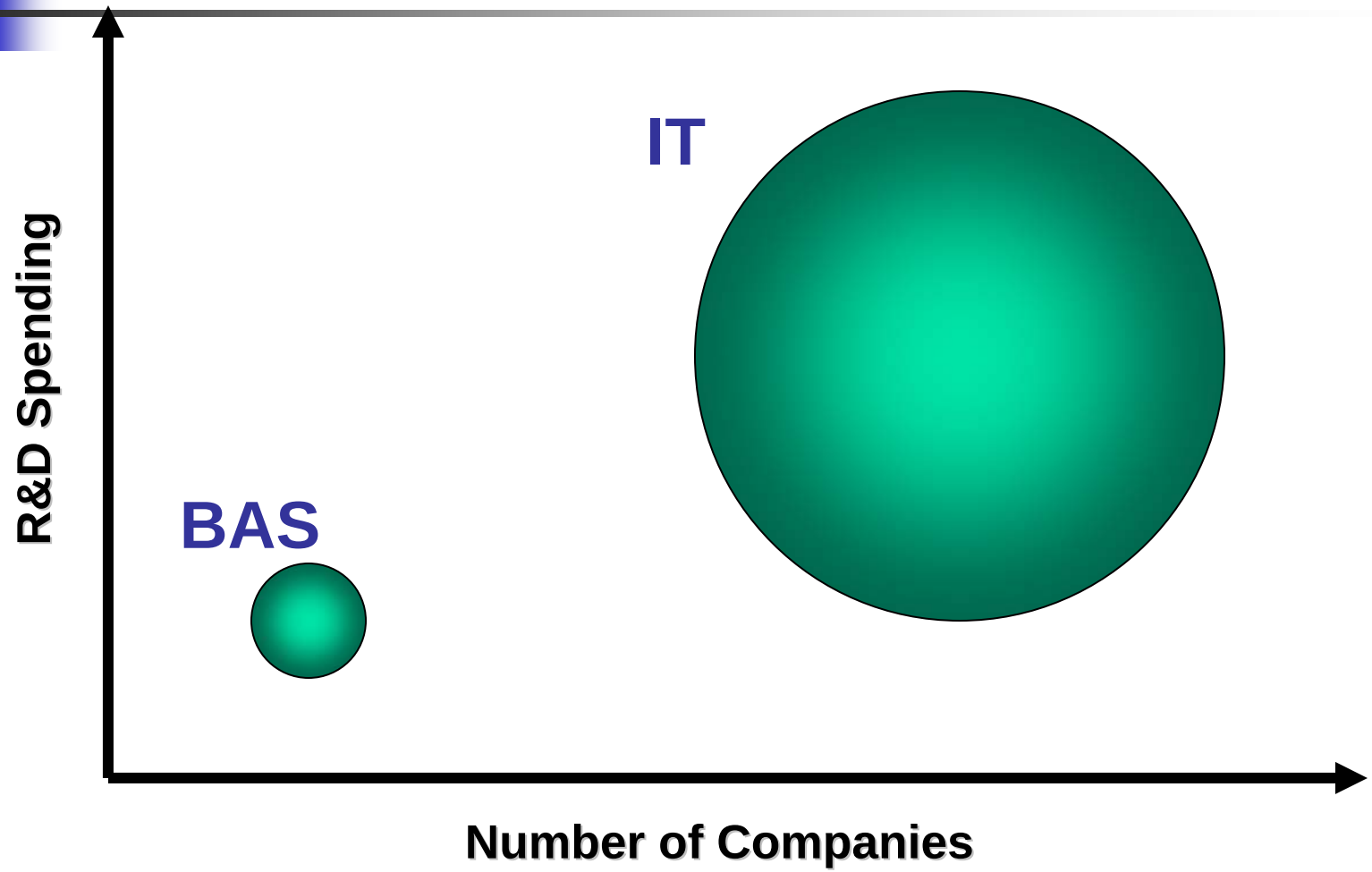
Interoperability for Energy Management



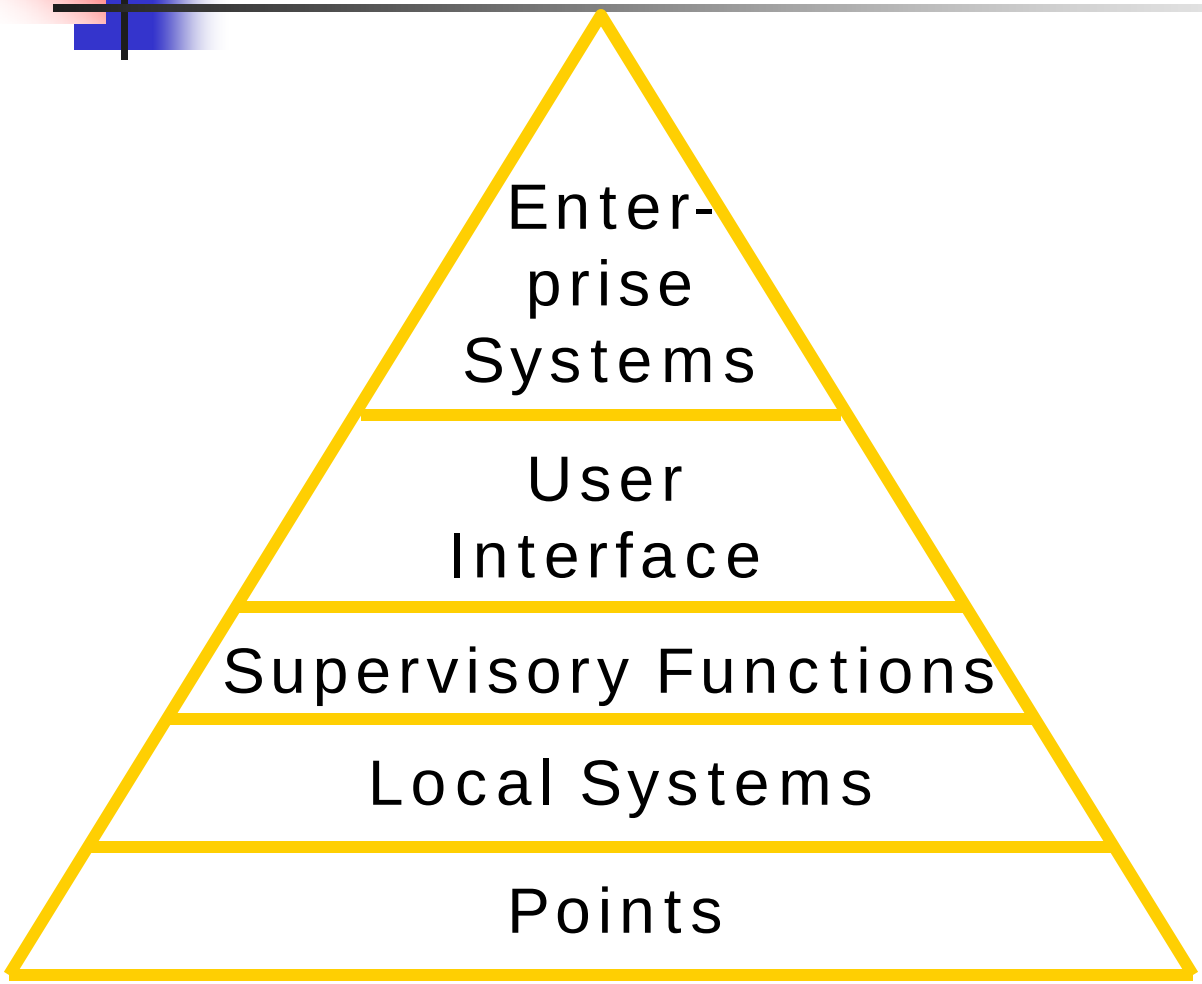
Technologies Available

- Building Automation System communication protocols
  - BACnet
  - LonTalk
  - Custom gateways
- TCP/IP communication protocols
  - HTTP/HTML (Browser interface)
  - XML/SOAP (Internet application programs)

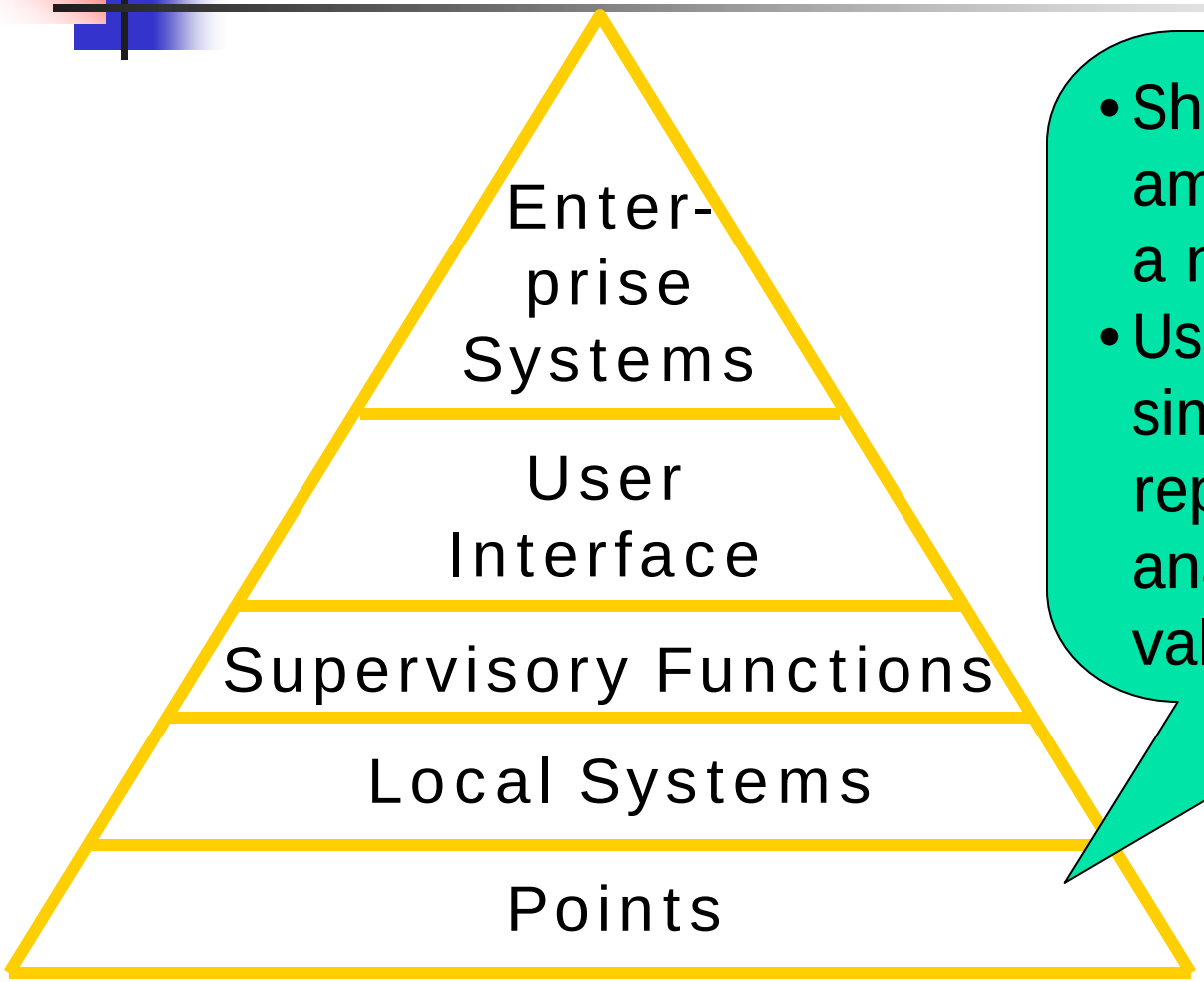
IT vs BAS R&D Spending



Levels of Interoperability

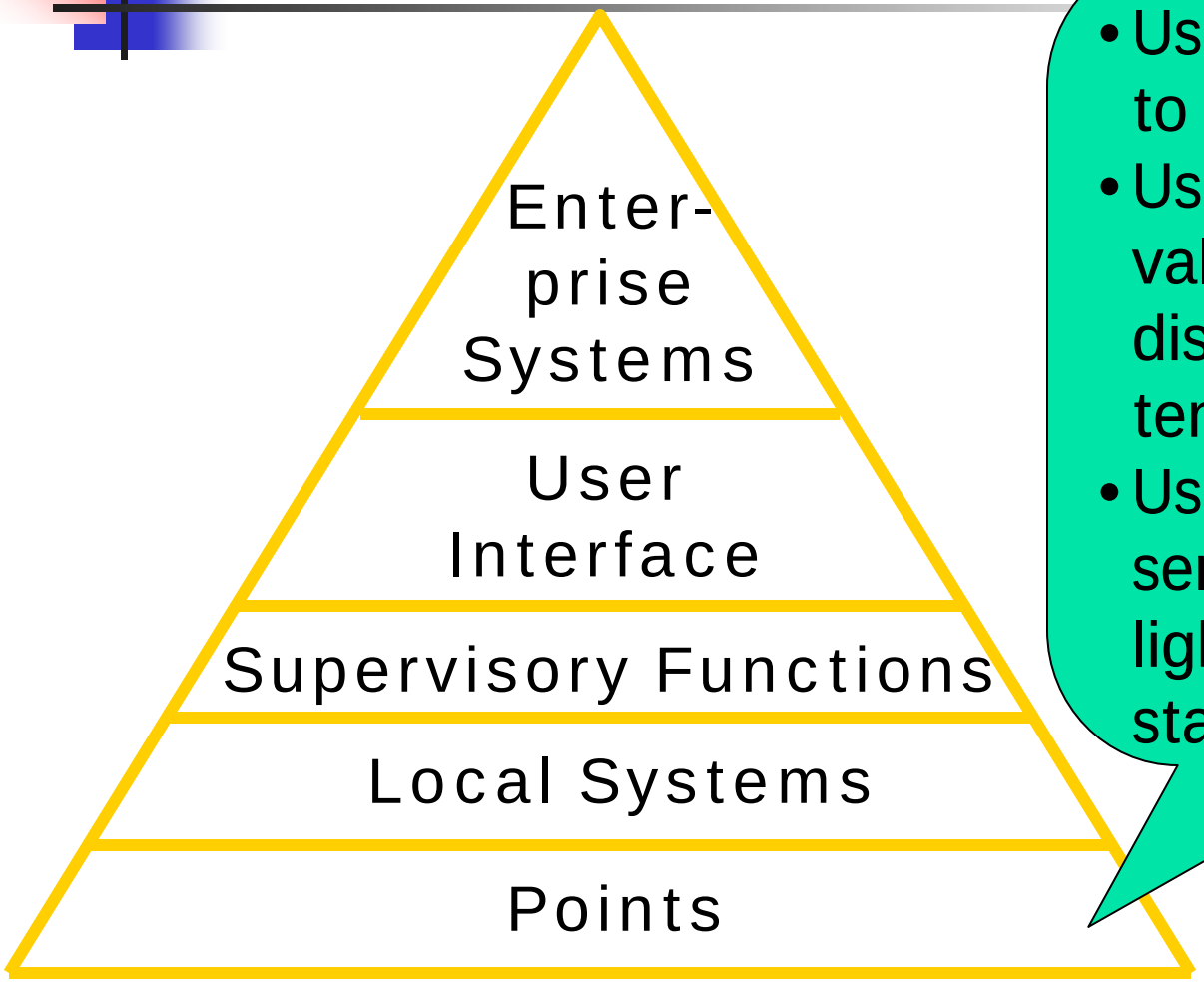


Point Integration



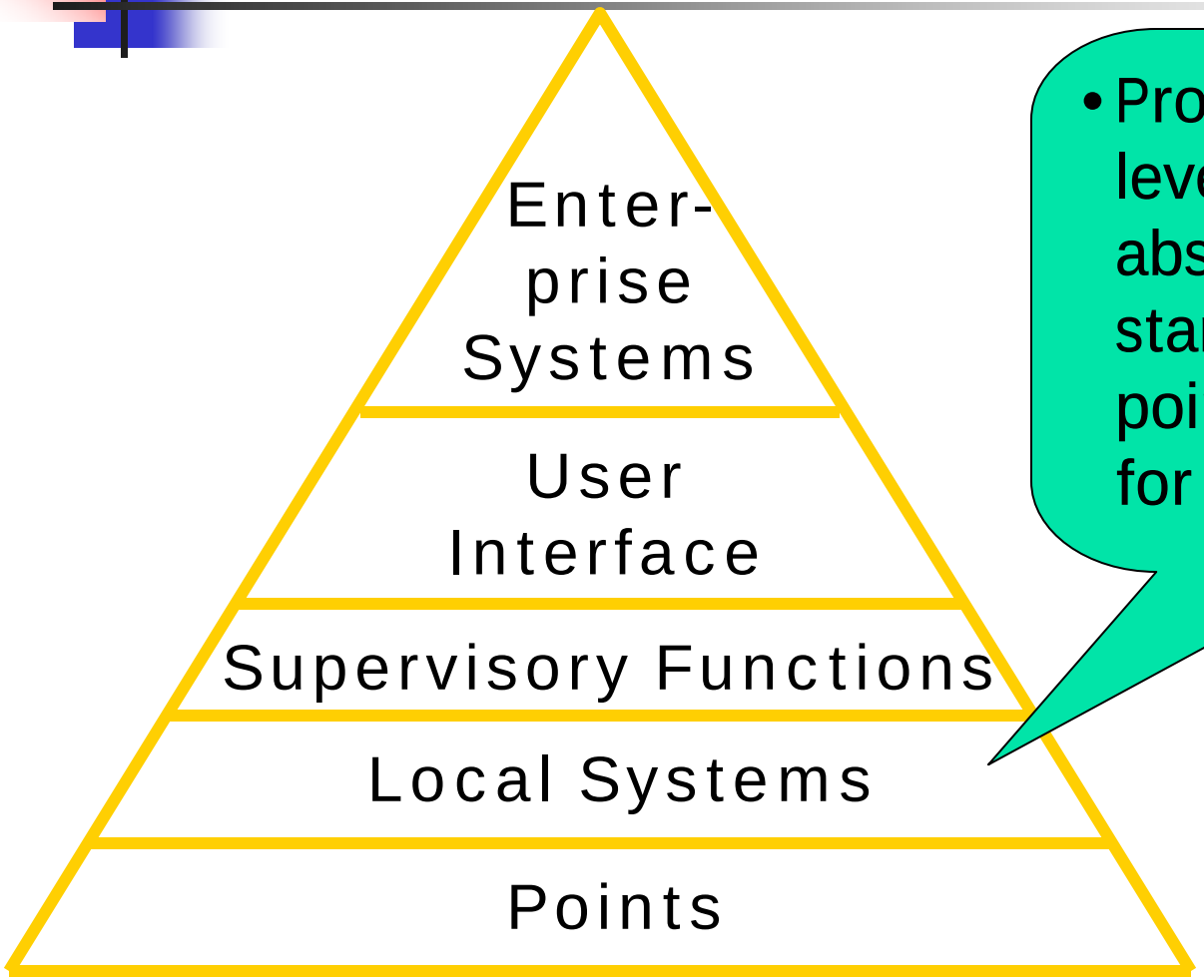
- Share sensor data among controllers over a network
- Usually limited to simple data representation (e.g., analog and binary values)

Applications by Integrating Points



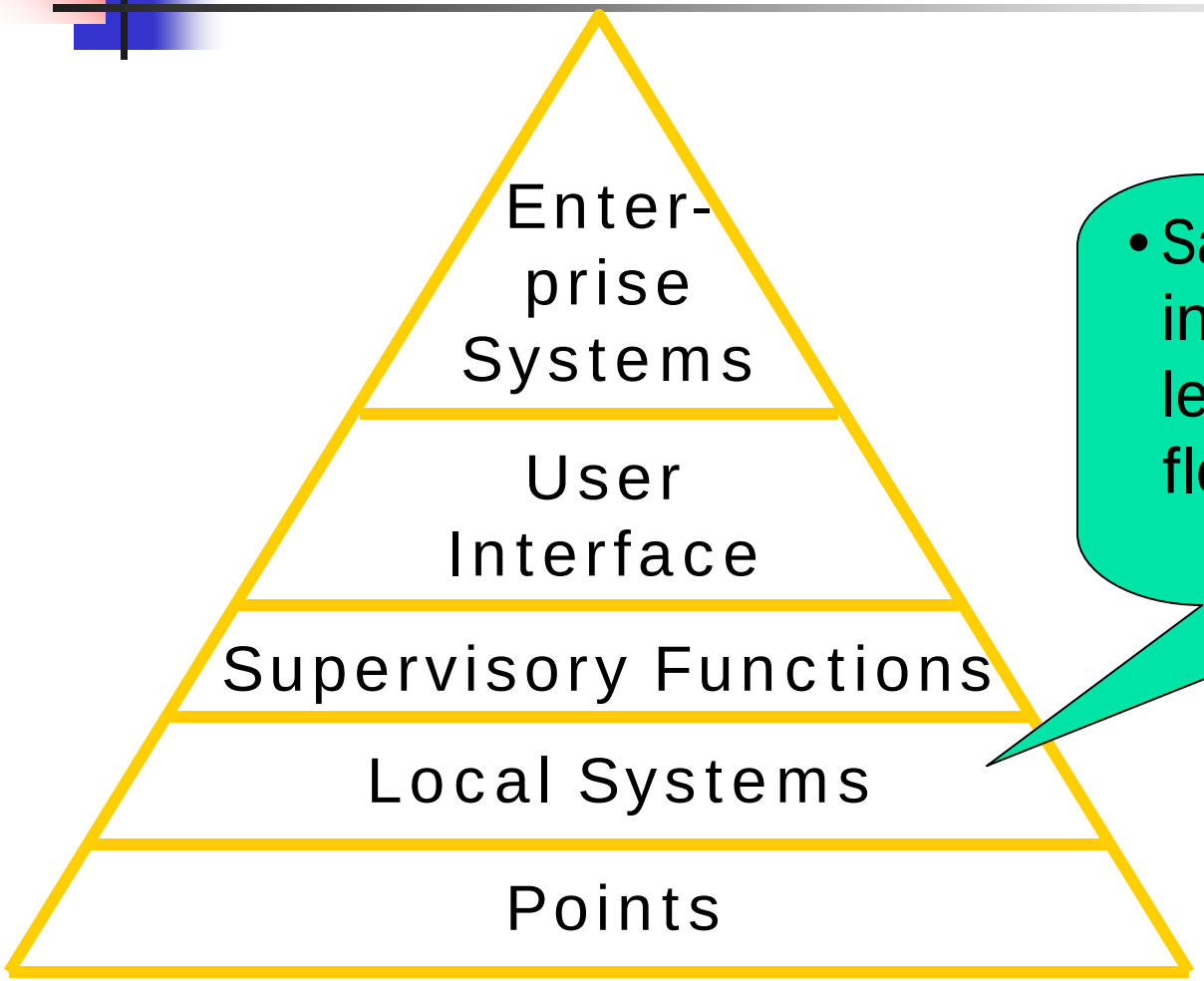
- Use VAV box position to reset AHU static
- Use cooling/heating valve position to reset discharge temperatures
- Use occupancy sensors to set space lighting and HVAC to standby

System Integration



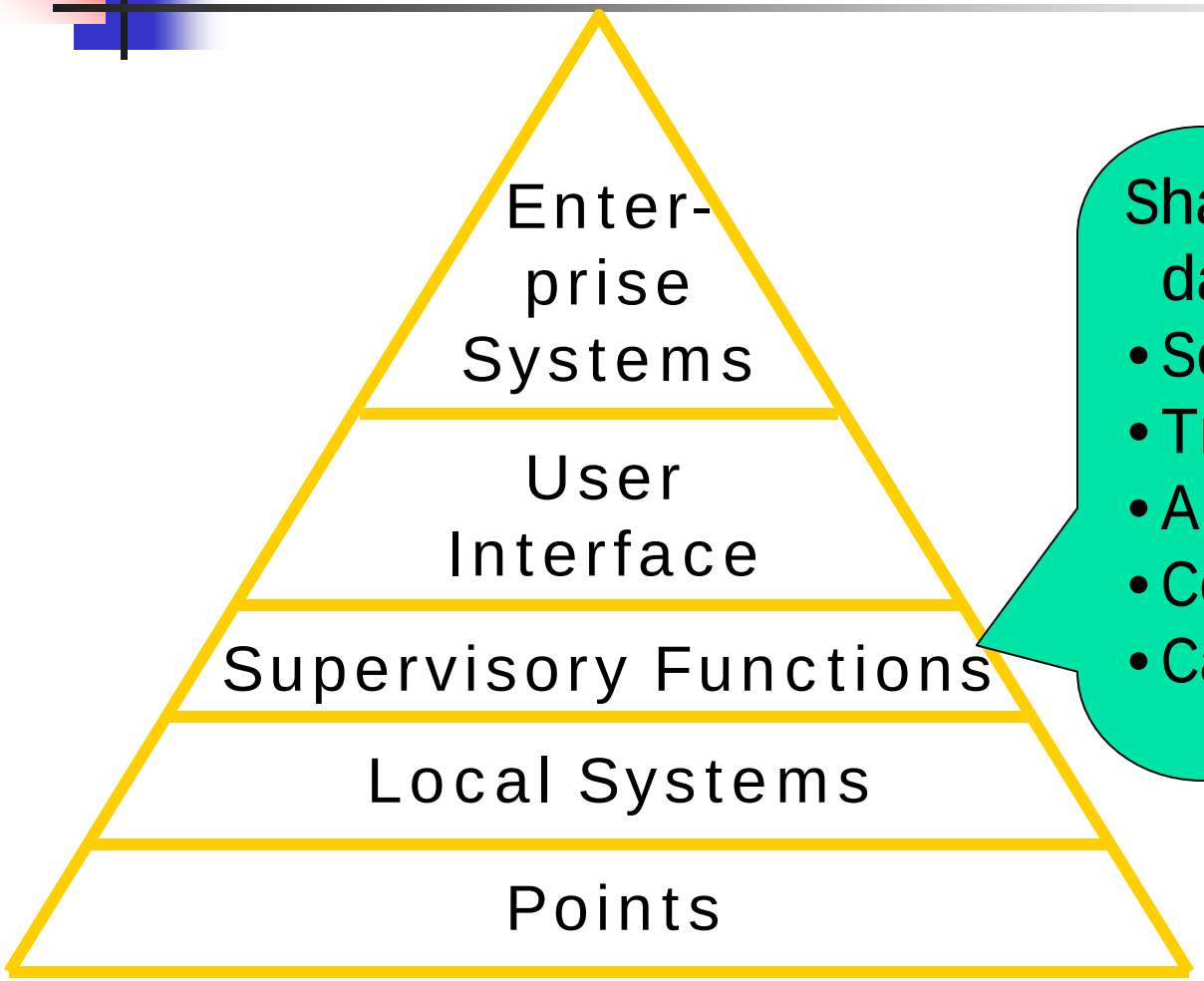
- Provides a higher level of data abstraction by standardizing what point data looks like for “typical” systems

Applications by Integrating Local Systems



- Same as point integration, but with less work (and less flexibility!!)

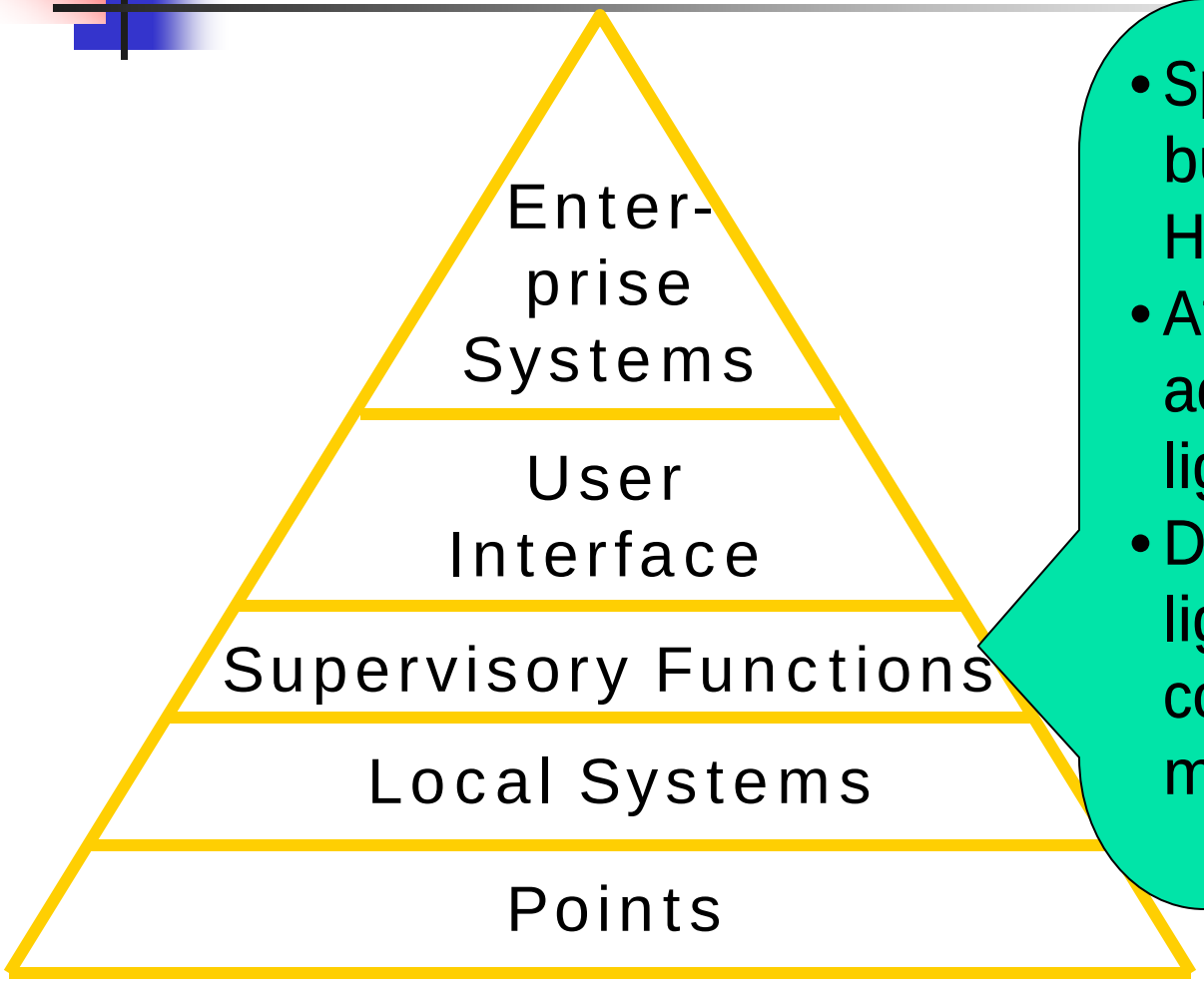
Supervisory Functions



Share more complex data types:

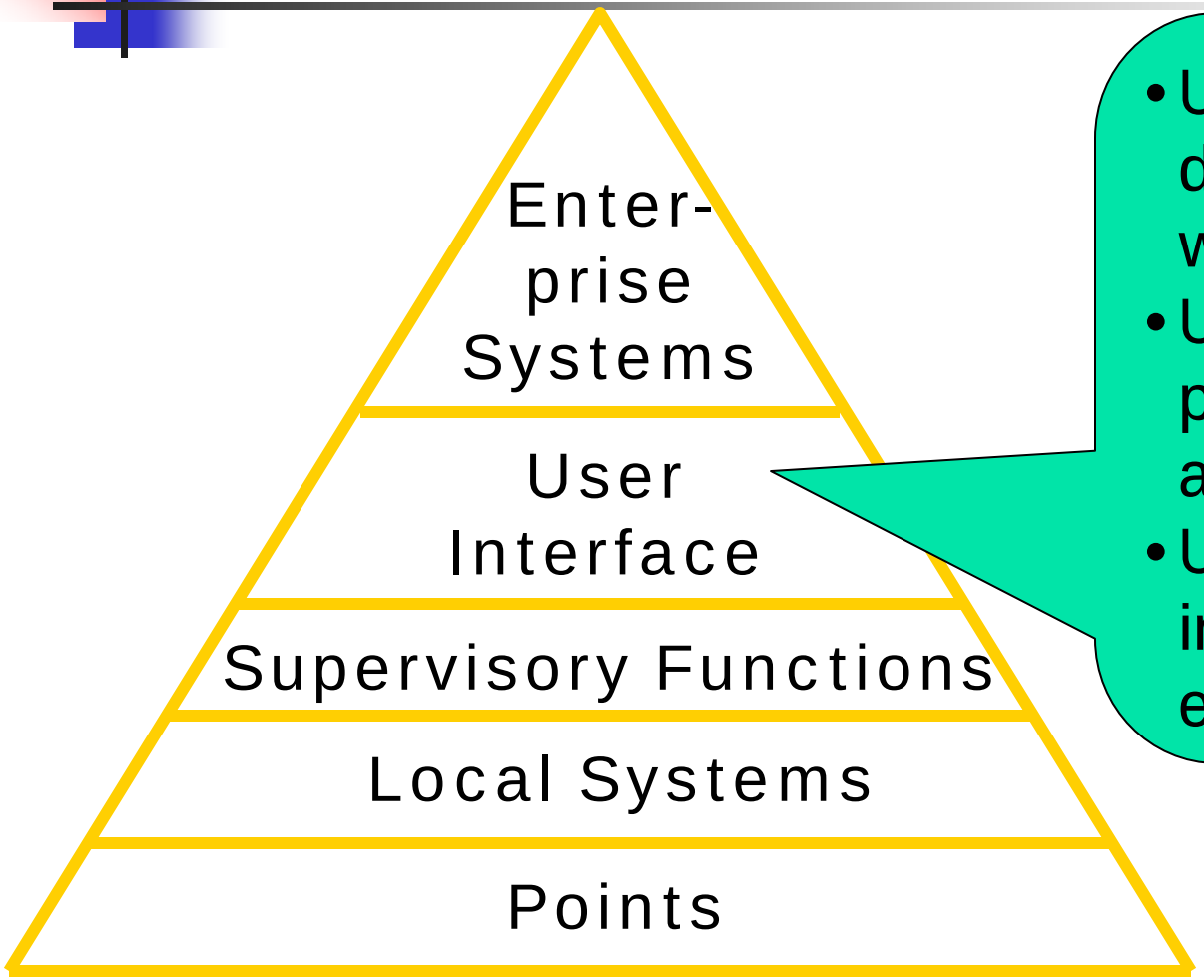
- Schedules, calendars
- Trend arrays
- Alarms
- Control logic
- Card access tables

Applications by Integrating Supervisory Functions



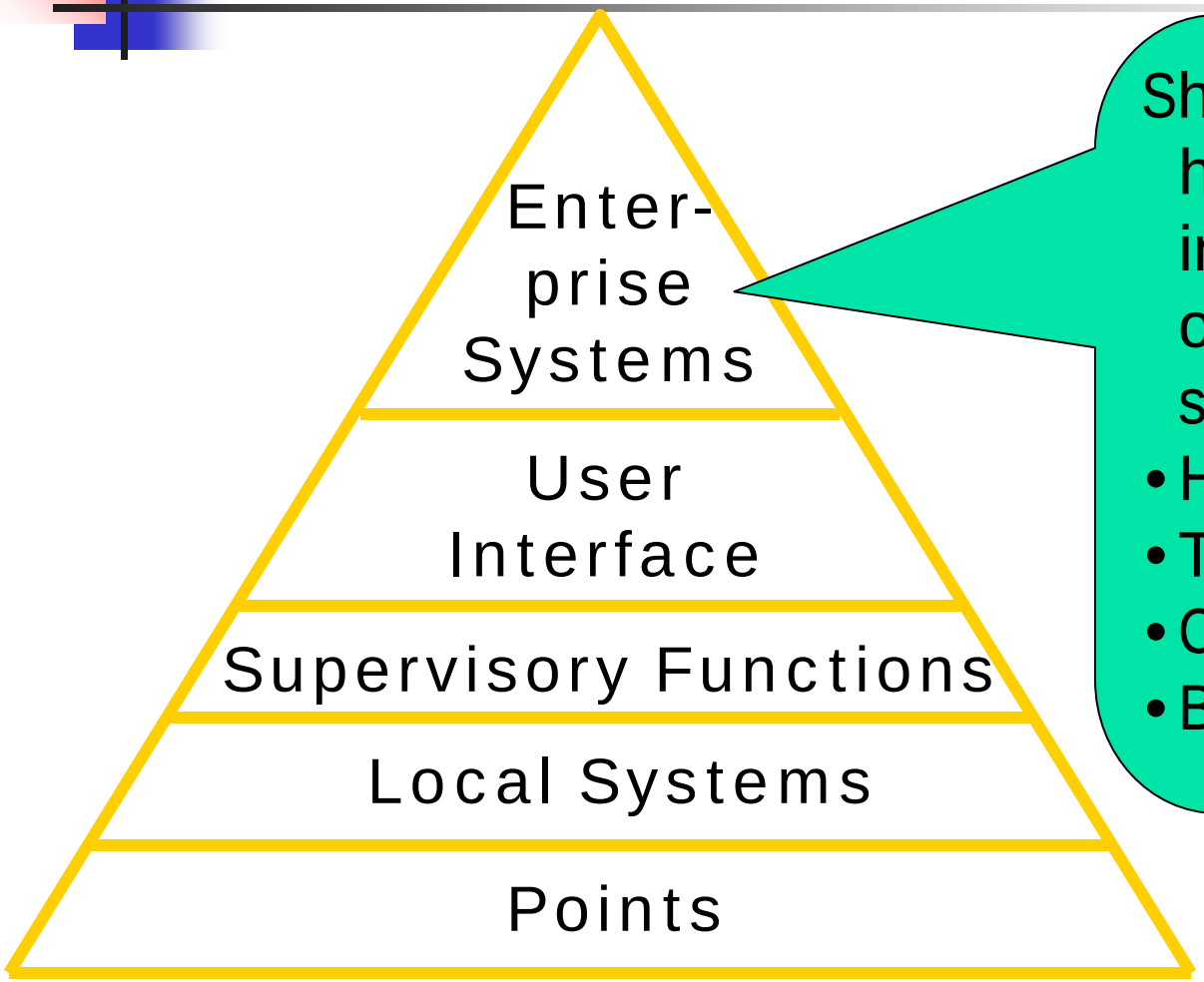
- Space, area, or building schedules for HVAC and lighting
- After-hours card access control of lighting/HVAC
- Demand control of lighting levels coordinated w/ mechanical cooling

User Interface Issues



- Use the same devices to interact with all systems
- Use the same presentation (look and feel)
- User productivity indirectly impacts energy savings

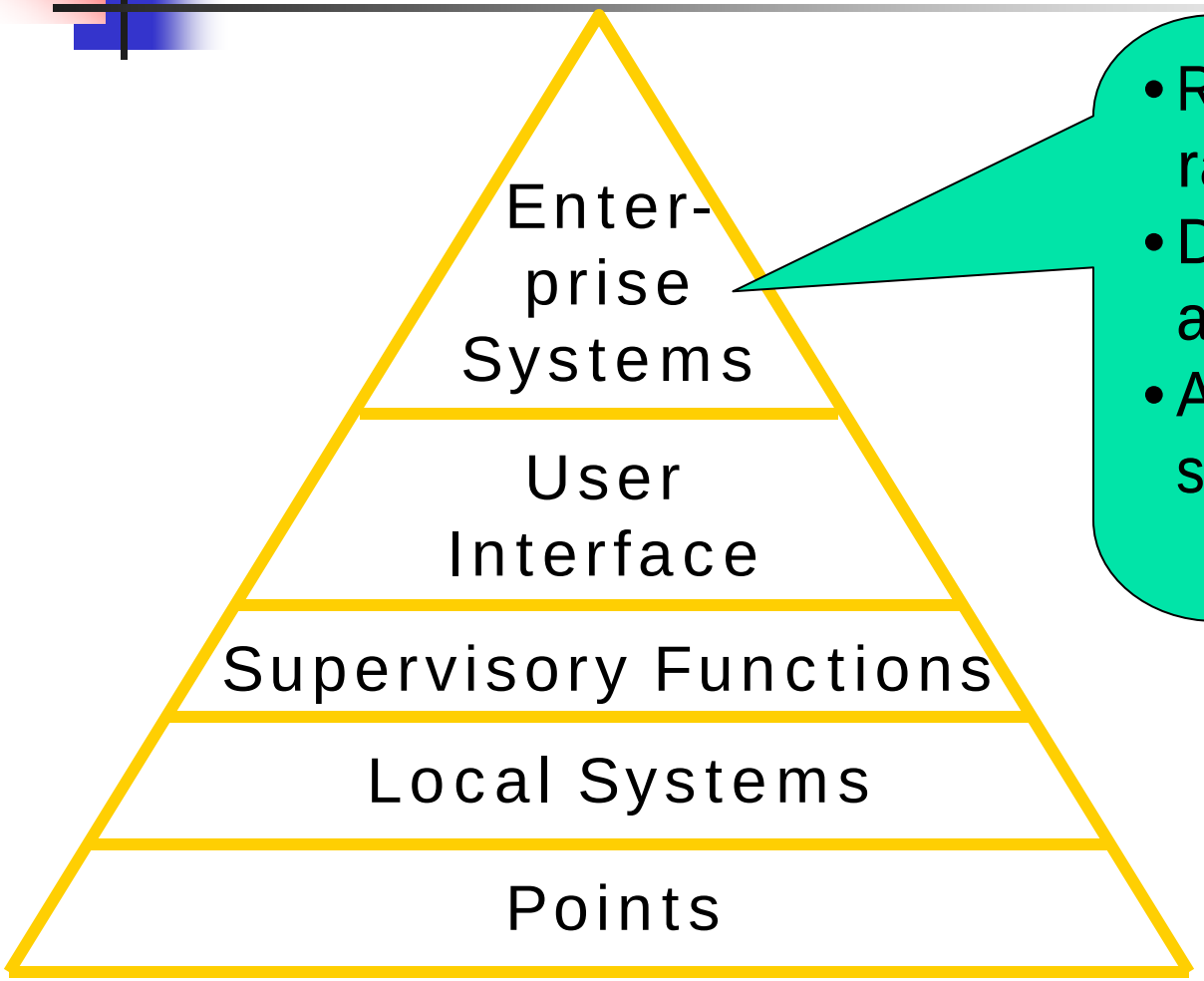
Enterprise Software Integration



Share real-time or historical facility information with other business systems:

- HR databases
- Tenant databases
- CMMS
- Budgets

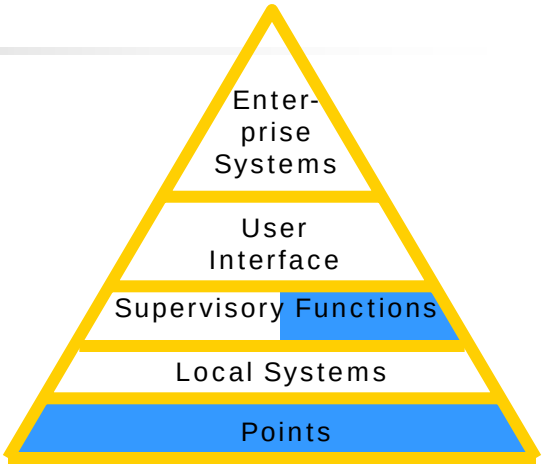
Applications of Enterprise Software Integration



- Real-time energy rate data from utility
- Department/tenant after-hours billing
- Activity based scheduling

BACnet

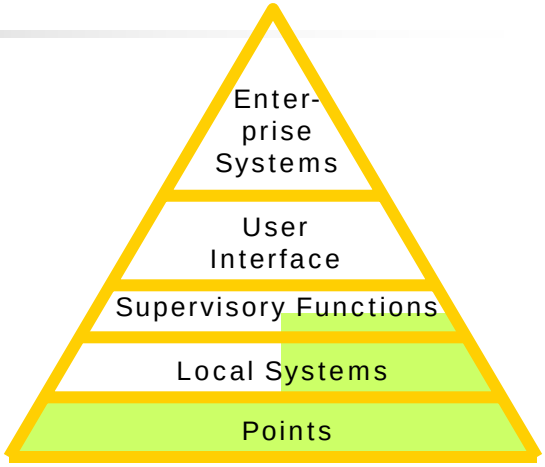
- ☺ Standardizes data content and delivery
  - Point objects
  - Supervisory functions
- ☺ Products available from many vendors
  - www.bacnetassociation.org
- 😐 No central “integration tool” required (or available!)



BACnet

LonMark

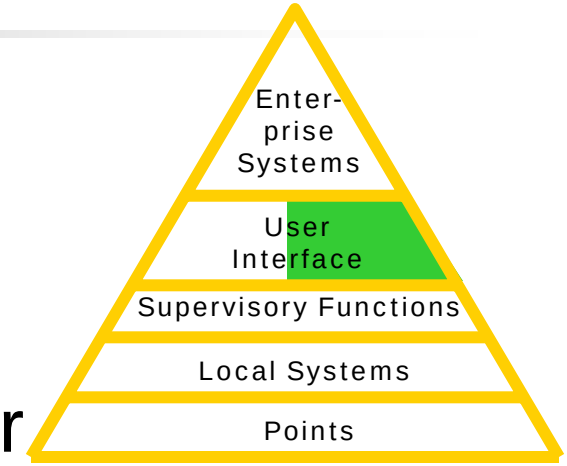
- ☺ Standardizes data content and delivery
  - Point objects
  - Functional Profiles
- ☺ Products available from many vendors
  - www.lonmark.org
- 😐 Standard network tools available



LonMark® Interoperability Association

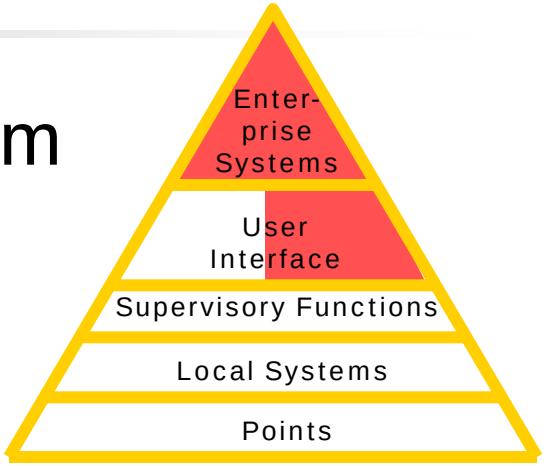
HTML

- ☺ Provides a common mechanism for a user to access information
- ☹ No standardization of the user presentation
- ☹ No exchange of meaningful information between systems

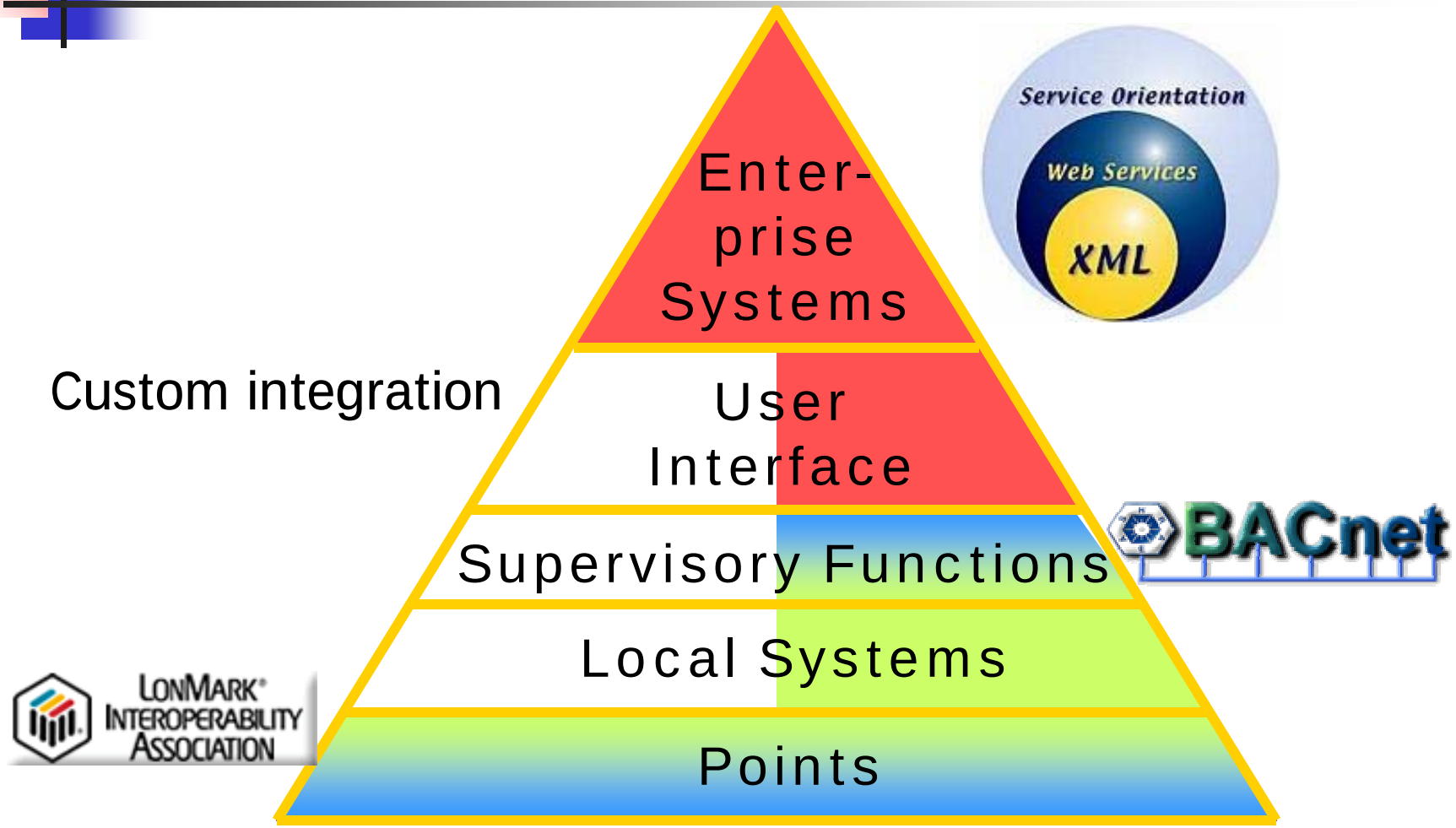


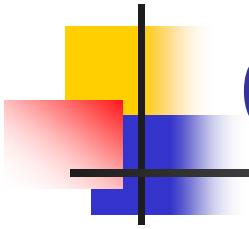
XML

- ☺ Provides a common mechanism to access information
- ☺ Defines a common method to exchange data with other business software applications
- 😐 Much work required in the industry to define the standard data representation



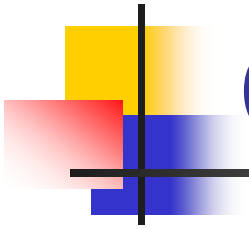
The Totally Integrated System





Conclusions

- Open, interoperable systems that reduce energy consumption are feasible
- Multiple technologies and protocols are required
  - Alternative: lock into a single vendor for the higher levels of the network)
- Customization is needed to make it do something useful
  - Plug and play is a myth



Conclusions

- Somebody needs to play an ongoing role as the systems integrator

Questions?